Infinova

FIBER OPTIC TRANSMISSION SYSTEM

N3751 & N3551 SERIES

Digital Two Video Channels with Two DIP Selectable Data and Ethernet Signal

User Manual

Infinova

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SERVICE NOTICE

The installation of this product should be made by qualified personnel. Do not attempt to service this product
yourself. Refer all servicing to qualified personnel.

If you require information during installation of this product or if service seems necessary, contact the local suppliers or Infinova at 1-732-355-9100 in 51 Stouts Lane, Monmouth Junction, NJ 08852 U.S.A. You must obtain a Return Authorization Number and shipping instructions before returning any product for service.

Our obligation under this warranty is limited only to the repair or replacement of any of our products, provided that products are used within the specified ratings and applications, and that products are applied in accordance with good engineering practices, and that products are proved by our examination to be defective.

This warranty does not extend to any Infinova products which have been subject to acts of accident, misuse, abuse, neglect, improper application or installation, improper operation or maintenance, connection to an improper voltage supply or to materials which have been altered or repaired outside an authorized Infinova factory repair center.

Information provided by Infinova is accurate and reliable. However, no responsibility is assumed by Infinova for its use; nor for any infringements of other rights of third parties which may result from its use. No license is granted by implications or otherwise under any patent or patent rights of Infinova.

WARNING

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

DO NOT LOOK INTO OPTICAL PORTS WITH POWER ON.

PRODUCT DESCRIPTION

Description

The N3751and N3551 series provide high quality reliable transmission of two digitally encoded composite video channels with either two DIP-selectable data (2D), or one RS232 and one DIP-selectable data (1D1B) and Ethernet signals over one optical fiber. The modules are compatible with PAL, SECAM, and NTSC EIA video signal. Data interface supports RS232, RS422, Manchester, Biphase, and 2-wire/4-wire RS485. Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments. Each transmitter or receiver incorporates status indicators for monitoring of proper system operation. The modules are available in either standalone, or card unit versions.

Standalone module	Card unit	Standalone module	Card unit

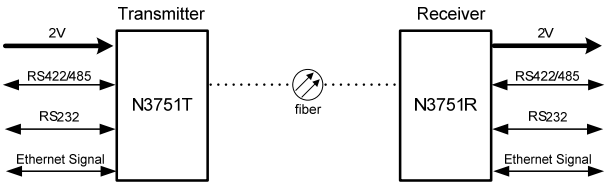
The N3751 series are compatible with 9/125 micron single-mode fibers.
The N3551 series are compatible with 50/125 or 62.5/125 micron multimode fibers.

Camera end transmitter N3751T is compatible with monitor end receiver N3751R.
Camera end transmitter N3551T is compatible with monitor end receiver N3551R.

Related product (optional)

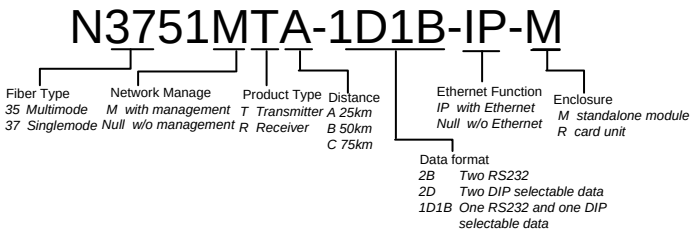
N3910-000X	19" 1U fan assembly unit
N3932	Lightning surge protection card for one video channel and one data channel
N3951	Fiber optical transmission repeater
N3952	8-channel contact closure signals collector
N3954	Control code distributor

System Diagram



ORDERING INFORMATION

Use the configuration chart below to select the options available for this product.



Note:

1. The transmission distance category is valid for single-mode product only. For all multi-mode products, there are only TA and RA models, and the transmission distance is 2km. For single-mode products, if the transmission distance is within 15km, the letter standing for distance shall be omitted, e.g. N3751T/R-1D1B-IP.
2. The product with "-IP" model number indicates it has Ethernet function.

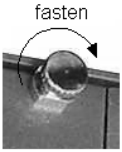
INSTALLATION

Installation of video and data interface

To install the apparatus, it is necessary to allow enough space to accommodate the bend radius of the optical cable connected to it. The transceiver requires as short as practical two BNC terminated coaxial cables to input/output the video signal. Data input/output uses a 9-pin terminal block connector.

Installation of card unit

Push the card unit along the guide rails (not in spaces between the rails). There is an Infinova logo on the front panel indicating the proper orientation. Press hard to make a good connection to motherboard - loud snap indicates firm connection. There are two captive screws on the front panel that can fasten the card unit to the subrack. They must be locked by hand in a clockwise manner (do not over tighten), see figure right below.

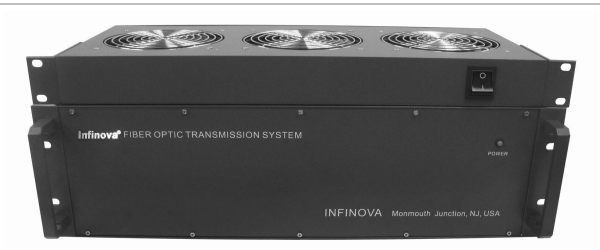


Full load of N3910-18S

There are 18 slots on N3910-18S.Besides N3910-18S, there are N3910-2S, N3910-3S, N3910-4S, N3910-6W and N3910-15R optional. There are 2 slot on N3910-2S, 3 slots on N3910-3S, 4 slots on N3910-4S, 6 slots on N3910-6W and 15 slots on N3910-15R respectively.

WARNING:

A FULL LOAD OF N3910-15R AND N3910-18S REQUIRES FORCED AIR COOLING IN THE RACK. TO AVOID OVER HEATING OF CARD UNITS, WHENEVER POSSIBLE, INSTALL IN EVERY OTHER SUBRACK.



Forced air cooling with N3910-000X fan assembly

Power supply for card unit

The unit is powered by a plug-in power supply that is provided with the appropriate desk chassis or EIA 19'' rack.

Power supply for stand-alone module

The card unit can be converted into a standalone module when installing into a 2-slot chassis N3910-2S that is powered by a plug-in 24VAC@830mA (N3921-24A-1 for 110V; N3921-24A-2 for 230V) power supply. Plug the wires into the connector; fasten the screws to make a firm connection.

N3921-power supply	Connection diagram

Note:
When the series is powered together with other devices (cameras and etc.) by a single 24VAC power supply, please make sure that the related device has a full-wave (bridge) rectifier circuit.

N3751T/R-1D1B & N3551T/R-1D1B

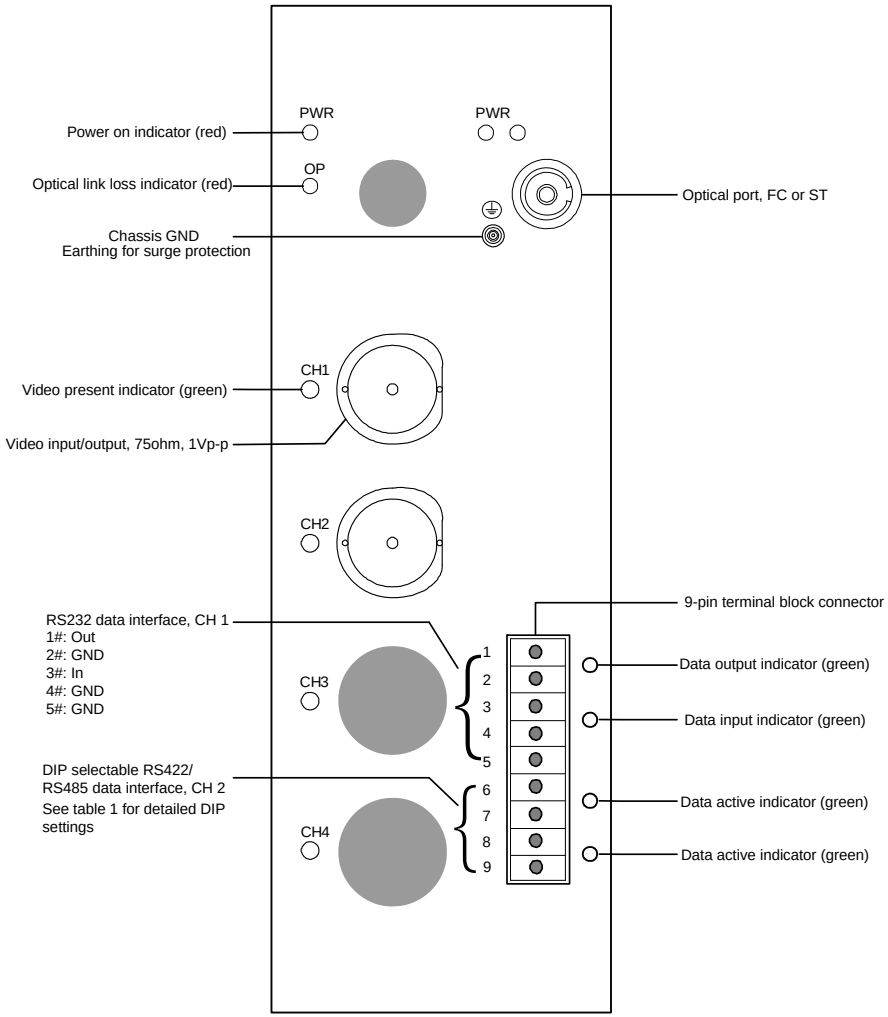


Figure 1. N3751T/R-1D1B & N3551T/R-1D1B

N3751T/R-2D & N3551T/R-2D

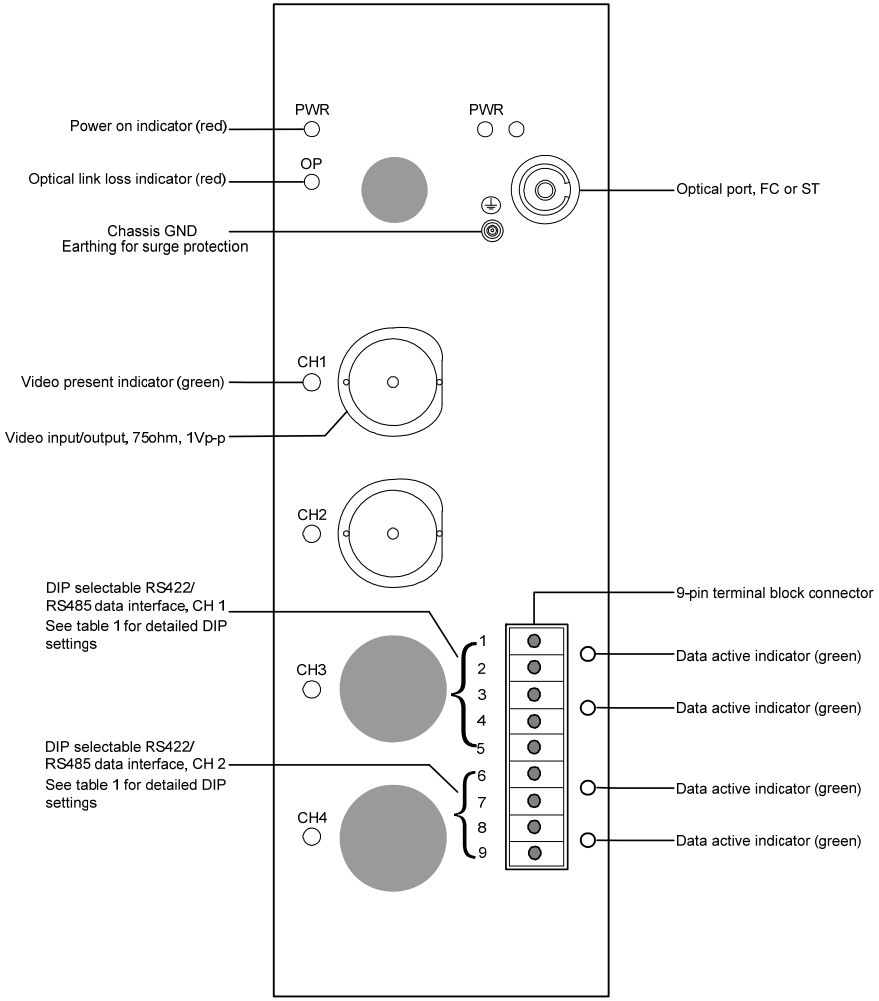


Figure 2. N3751T/R-2D & N3551T/R-2D

N3751T/R-2B & N3551T/R-2B

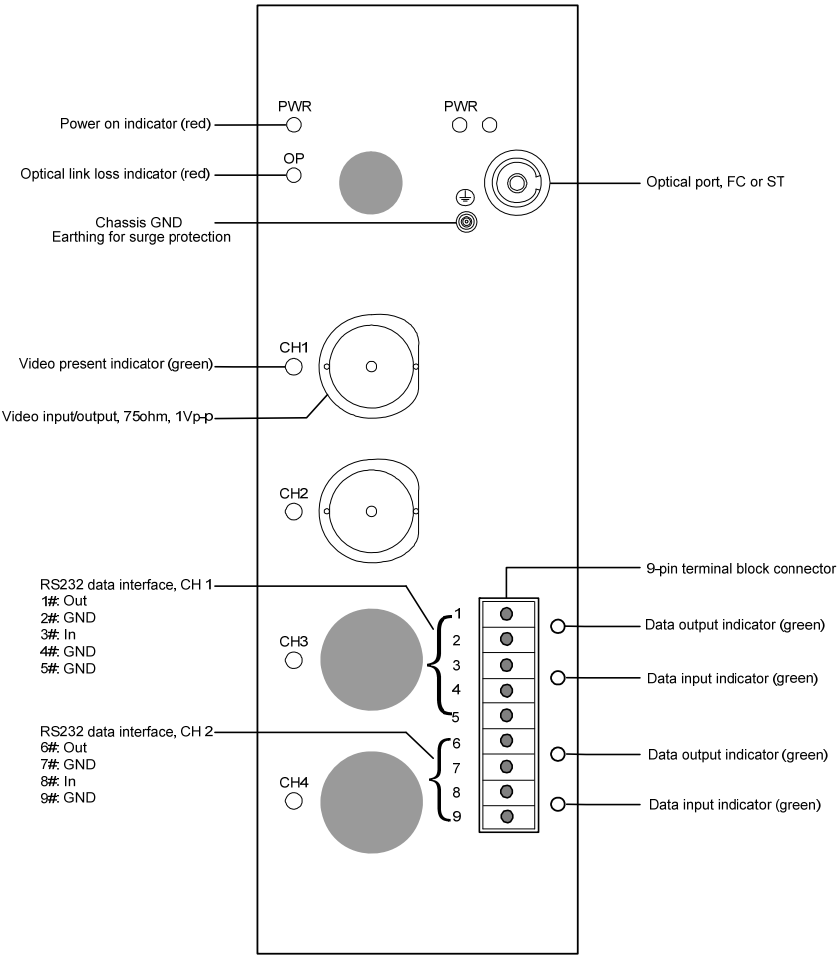


Figure 3. N3751T/R-2B & N3551T/R-2B

N3751T/R-1D1B-IP & N3551T/R-1D1B-IP

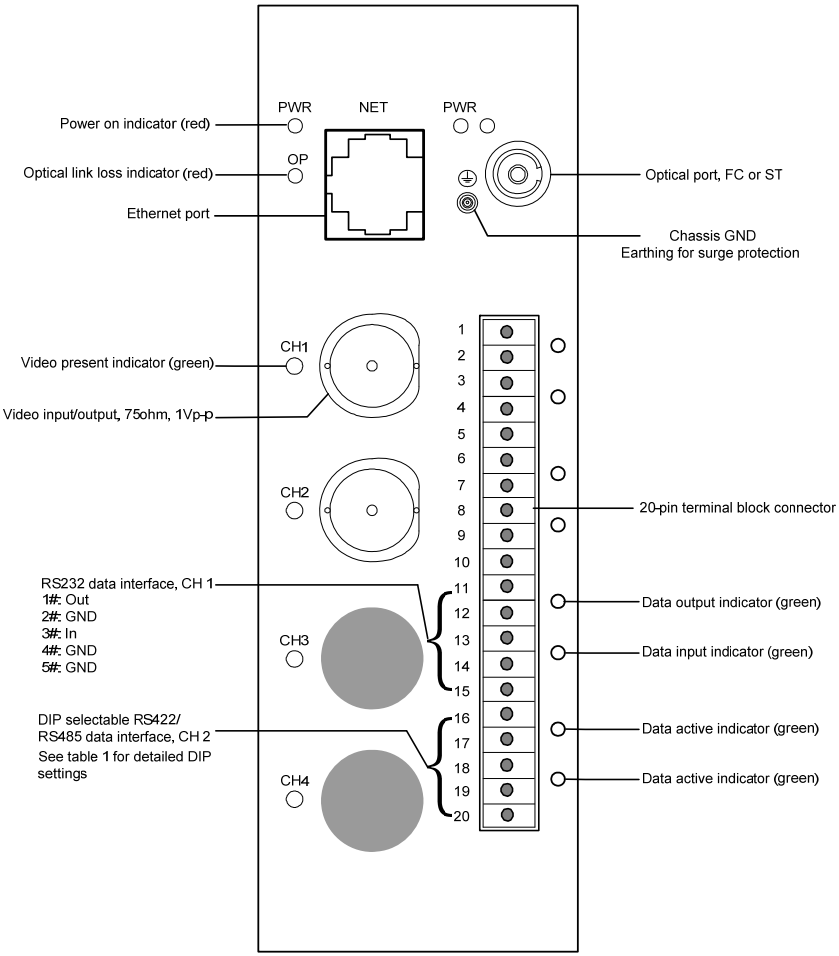


Figure 4. N3751T/R-1D1B-IP & N3551T/R-1D1B-IP

N3751T/R-2D-IP & N3551T/R-2D-IP

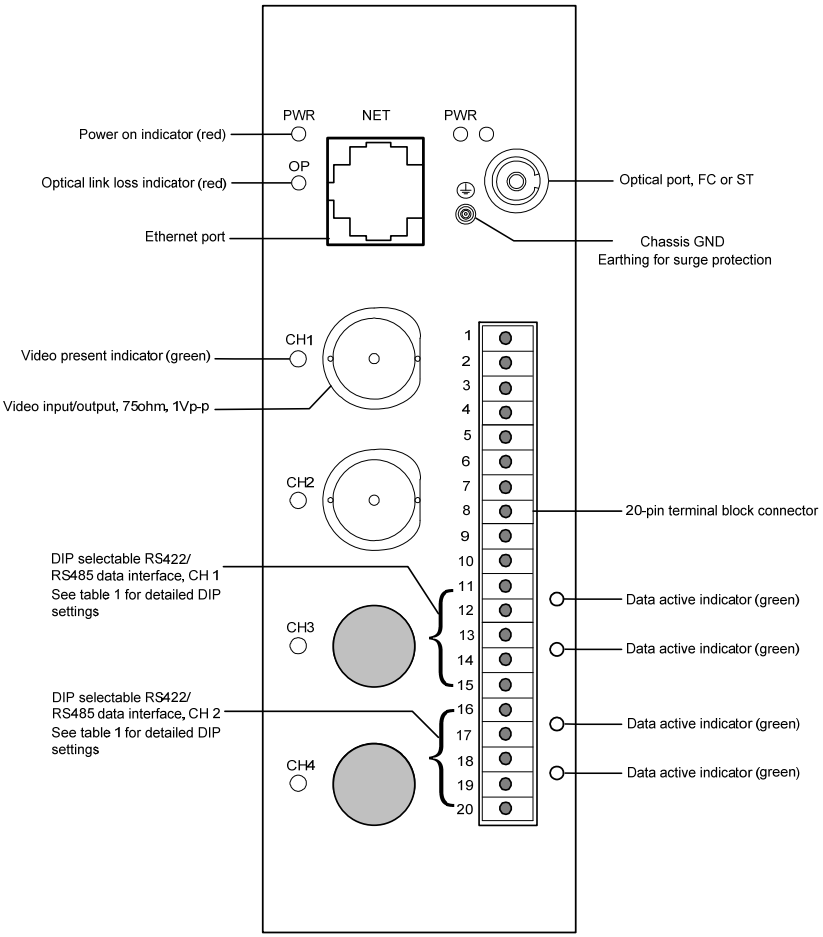


Figure 5. N3751T/R-2D-IP & N3551T/R-2D-IP

N3751T/R-2B-IP & N3551T/R-2B-IP

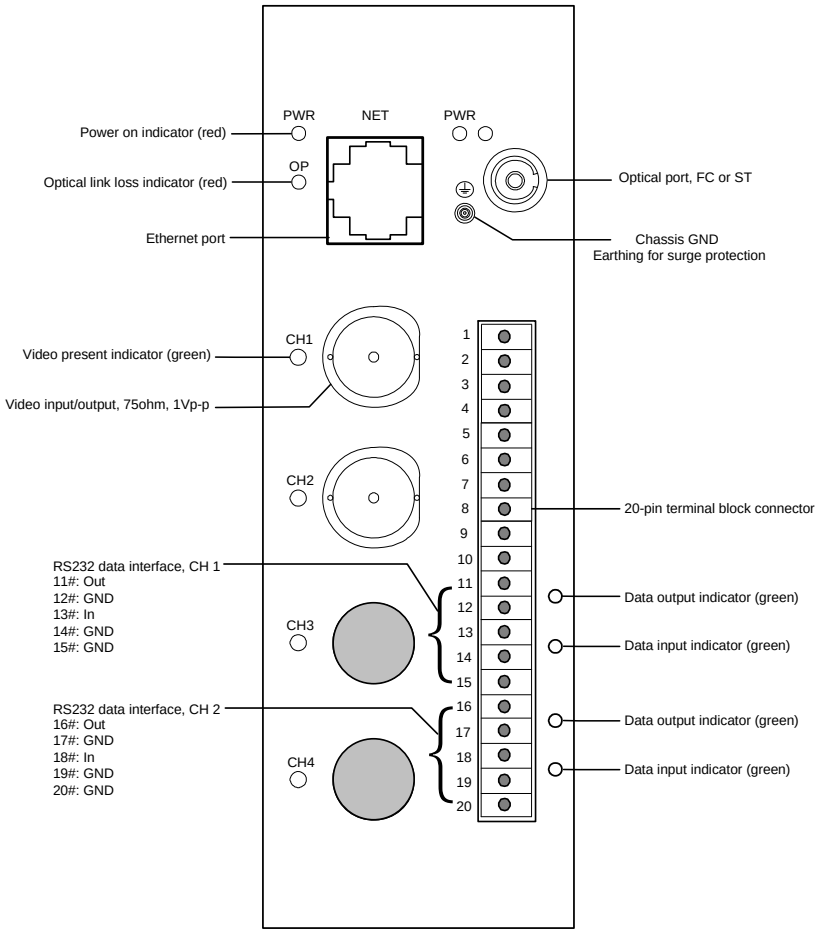


Figure 6. N3751T/R-2B-IP & N3551T/R-2B-IP

Location of DIP switches

For 1D1B sub-series, the DIP switches, SW2, are located on the board as shown in figure 7. SW2-3 and SW2-4 set the data format for CH2 (D) data channel. SW2-1 and SW2-2 are factory default setting, please leave them as they were.

For 2D sub-series, the one DIP switches, SW2, are located on the board, see figure 7. SW1-1 and SW1-2 set the data format for CH1 data channel; SW1-3 and SW1-4 set the data format for CH2 data channel.

For 2B sub-series, the DIP switches are factory default setting. Please leave them as they were.

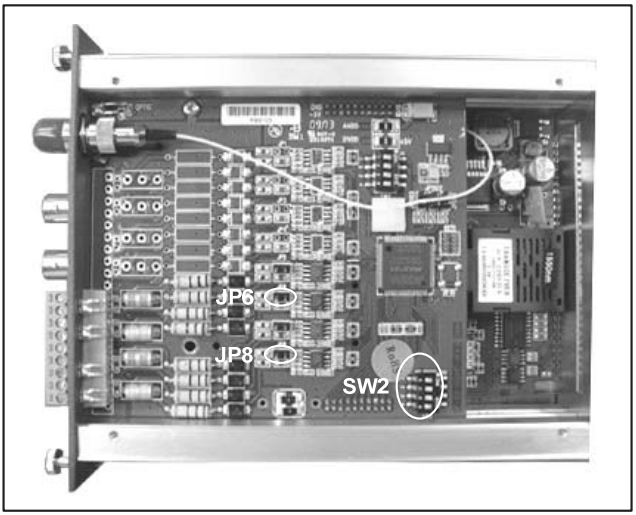


Figure 7. Location of on-board DIP switch

Setting line termination resistor

A multipoint bus architecture requires termination at both ends of the bus line to restrain signal reflection. The termination resistors must be within 20 percent of the characteristic impedance of the cable and can vary from 90Ω to 120Ω.

For 1D1B sub-series, jumper JP8 is used to connect/disconnect 120Ω termination resistor. Attach JP8 to connect a 120Ω termination for CH2, they are identical on both transmitter and receiver for specified data format. See table 1 below for more details.

For 2D sub-series, there are 2 jumpers, JP6, JP8 on board for setting line termination for their related data channel. Attach JP6, JP8 to connect a 120Ω termination for CH1, CH2 data channel respectively. Otherwise, detach JP6, JP8 to disconnect 120Ω termination resistor. See figure 5 for the specific position of JP6 and JP8.

Setting data format

Please refer to Table 1 for detailed switch settings and pin definitions for each channel.

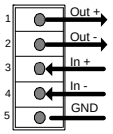
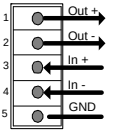
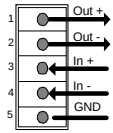
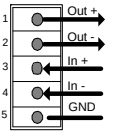
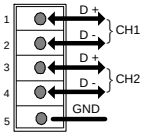
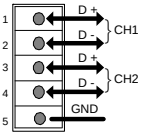
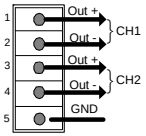
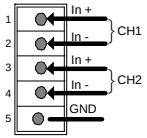
Data format	DIP	Transmitter	Receiver
Full duplex RS485			
RS422/Manchester/Biphase			
Half duplex RS485 (two channels)			
Return RS422/Manchester/Biphase (two channels)			

Table 1. DIP SWITCH SETTING REFERENCE

Note:

1. In table 1, pin 1 represents the pin with MINIMUM number of each data channel; pin 5 represents the pin with MAXIMUM number of each data channel. For products without IP function, users only need to refer to the definition of Pin 1 to Pin 4.
2. In table 1, DIP-1 and DIP-2 represent the DIP with SMALLER number and the DIP with LARGER number of the two configuring DIPs respectively.

TYPICAL SYSTEM CONFIGURATION

Two video channels with two DIP selectable data

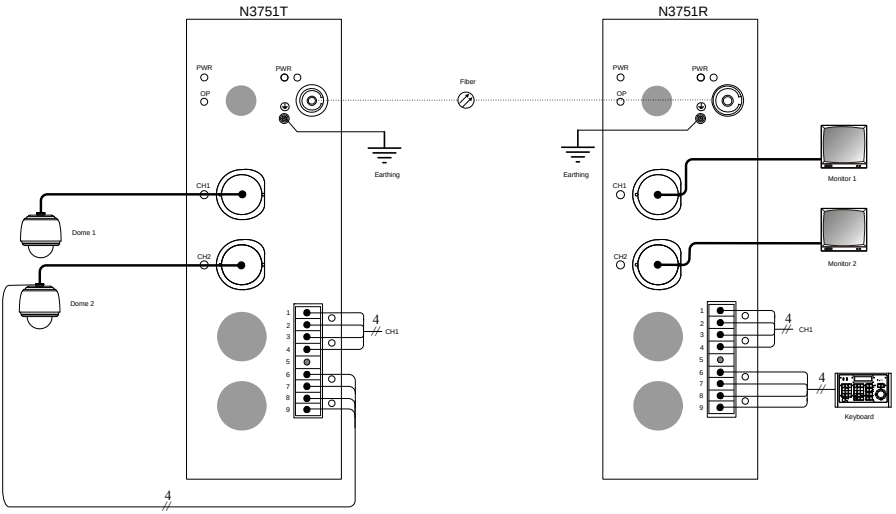


Figure 8. Two video channels with two DIP selectable data

Note:

1. The data format for both channels can be Manchester, Biphase, RS422 or RS485. Refer to Table 1 (Page 13) for detailed DIP settings and pin definitions.
2. Please refer to termination resistor (Page 12) for detailed settings of termination resistor.

Two video channels with two RS232

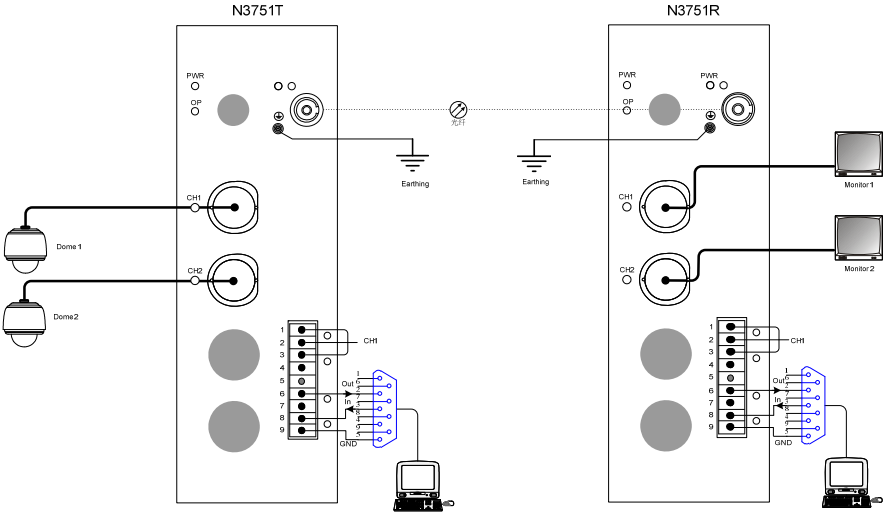


Figure 9. Two video channels with two RS232

Note:
Please refer to related panel description (2B) for detailed pin definitions.

Two video channels with one DIP selectable data and one RS232

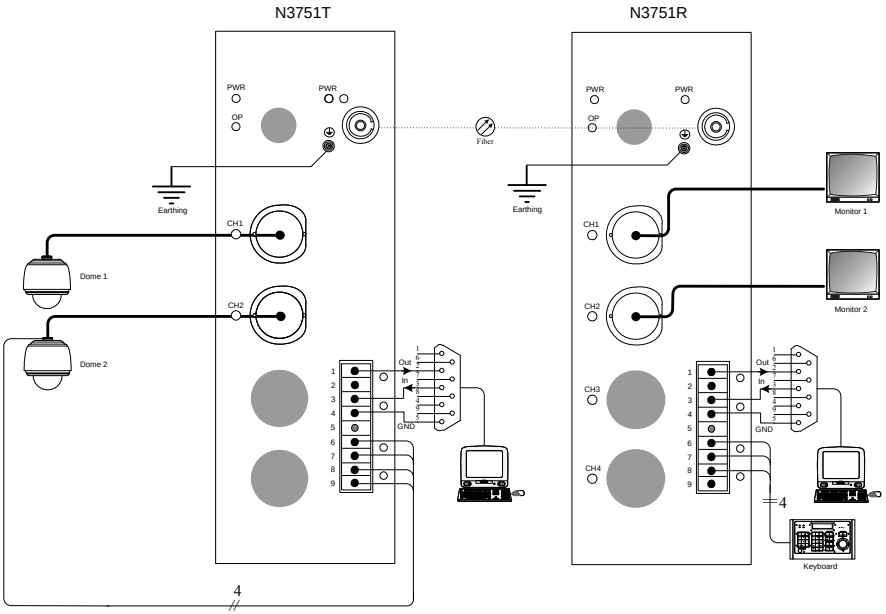


Figure 10. Two video channels with one DIP selectable data and one RS232

Note:

1. Please refer to related panel description (1D1B) for the pin definitions of CH1.
2. The date selectable for CH2 is RS422，Manchester/Biphase or RS485. Please refer to Table 1 (Page 13) for detailed data format settings and pin definitions for CH2.
3. Please refer to termination resistor (Page 12) for detailed settings of termination resistor.

DAISY CHAIN

We can use daisy chain connection to simplify the wiring and controlling of remote domes. The control signal is connected to all of the receivers, and transmitted to all of the transmitters through fiber optic respectively. In the remote site, the specified dome will act as the control signal instructs. The number of video receiver daisy-chained depends on the driving capability of code source.

System Diagram

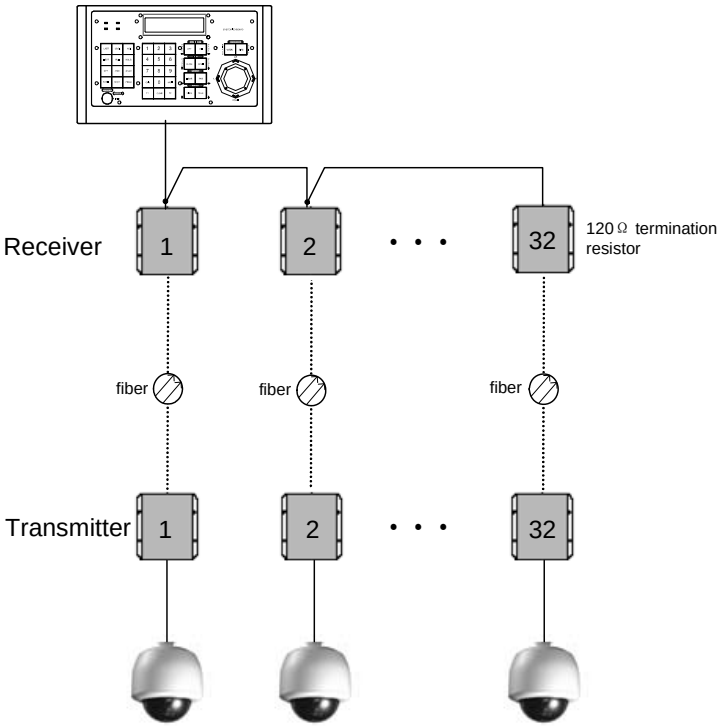


Figure 11. Daisy chain diagram

Note:
There should be a 120Ω termination resistor on the final receiver for restraining signal reflection. Please pay attention to it.

Surge protection circuits are implemented to protect Infinova's products against transient surge and over voltage. Over voltage can be caused by AC power or lightning flash disturbances that are induced or conducted onto the data line. It's important that good earthing or grounding be applied to ensure the proper function of surge protection circuit.

For reinforced protection, N3932 are strongly recommended to protect your investment.

Typical application connection

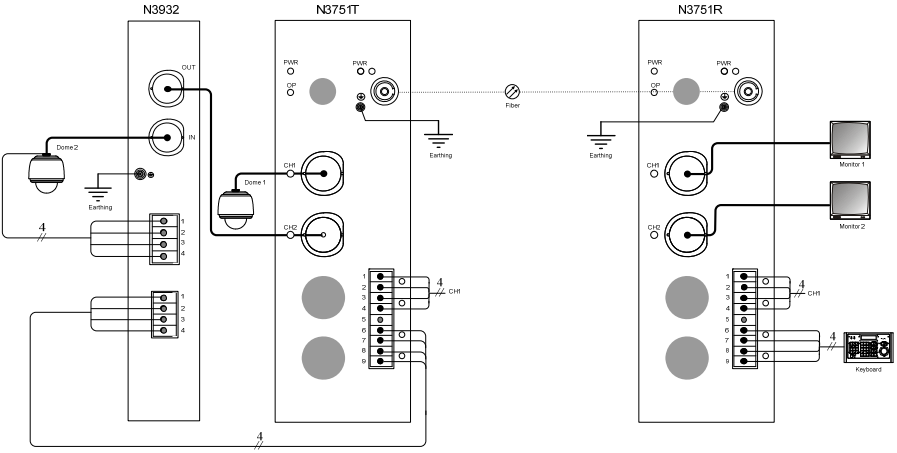


Figure 12. Lightning surge protection

The N3951 series is used between transmitter and receiver to extend the transmission distance of fiber optical system. It magnifies the optical signal received from transmitter, and sends it to receiver. By using a N3951, the transmission distance of the system is doubled.

Typical application connection

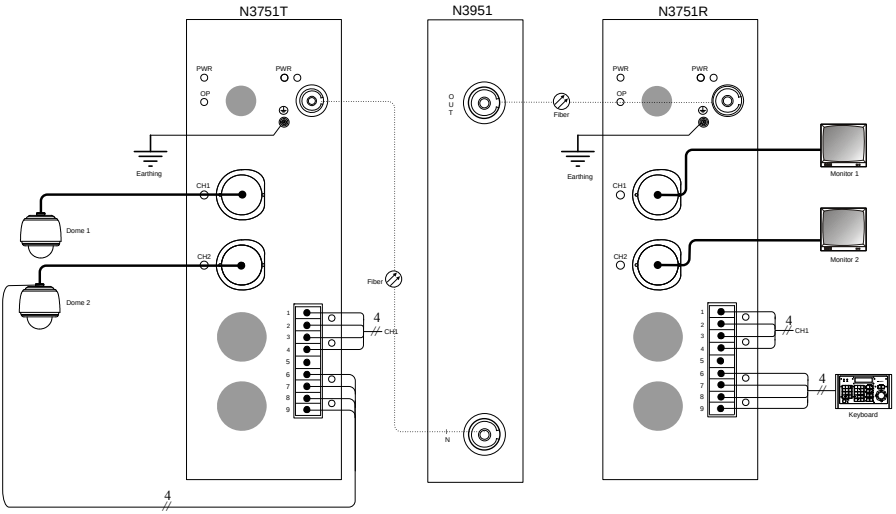


Figure 13. Transmission repeater

CONTACT CLOSURE SIGNAL

The N3952 series is a contact closure signals collector. This series can convert the 8 channel input contact closure signals to one RS232/RS422/RS485 data, and convert input RS232/RS422/RS485 data to 8 channel contact closure signals. It can transmit the contact closure signals over a long distance when connecting with fiber optical transmission system. The number of contact closure channels is default setting, so is the data format.

Typical application connection

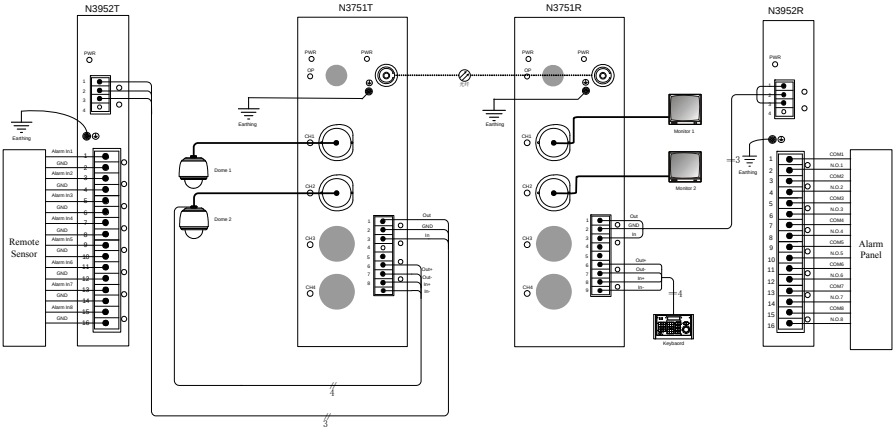


Figure 14. Contact closure signal connection

The N3954 is a code distributor designed for star connection where the code source is too far away from the video receiver and overload or reflection occurs.

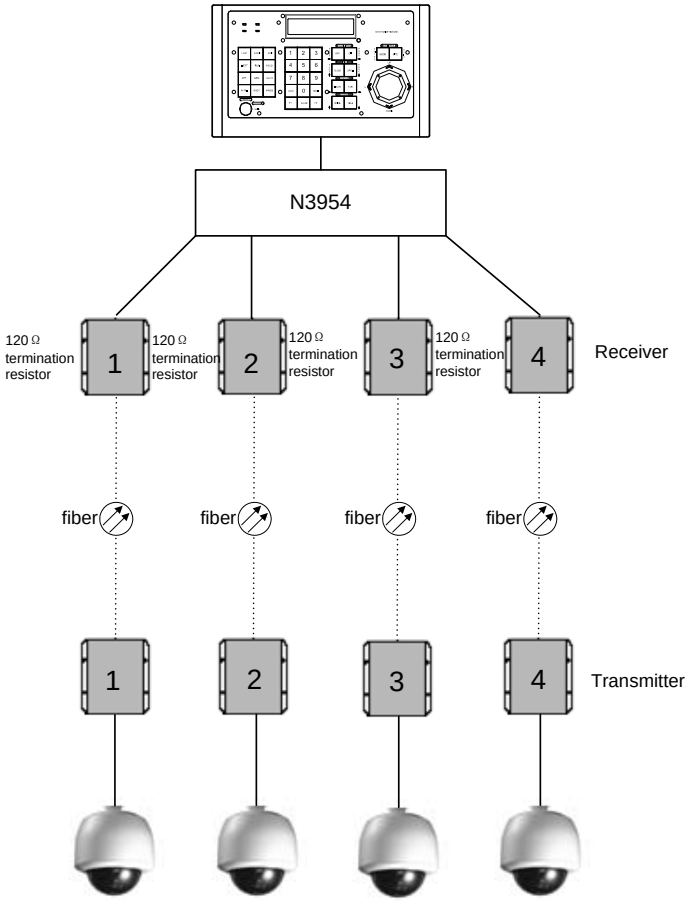


Figure 15. Code distributor diagram

Relation between 24VAC Cable Diameter and Transmission Distance

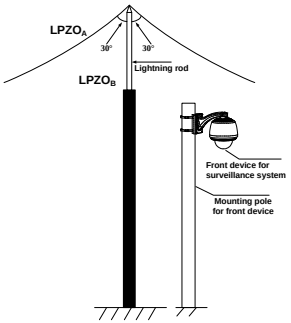
In general, the maximum allowable voltage loss rate is 10% for AC-powered devices. The table below shows the relationship between transmission power and maximum transmission distance under a certain specified cable diameter, on condition that the 24VAC voltage loss rate is below 10%. According to the table, if a device rated at 50W is installed 17-meter away from the transformer, the minimum cable diameter shall be 0.8000mm. A lower diameter value tends to cause voltage loss and even system instability.

Diameter (mm) / Distance (ft / m) / Power (W)	0.8000	1.000	1.250	2.000
10	283 (86)	451 (137)	716 (218)	1811 (551)
20	141 (42)	225 (68)	358 (109)	905 (275)
30	94 (28)	150 (45)	238 (72)	603 (183)
40	70 (21)	112 (34)	179 (54)	452 (137)
50	56 (17)	90 (27)	143 (43)	362 (110)
60	47 (14)	75 (22)	119 (36)	301 (91)
70	40 (12)	64 (19)	102 (31)	258 (78)
80	35 (10)	56 (17)	89 (27)	226 (68)
90	31 (9)	50 (15)	79 (24)	201 (61)
100	28 (8)	45 (13)	71 (21)	181 (55)
110	25 (7)	41 (12)	65 (19)	164 (49)
120	23 (7)	37 (11)	59 (17)	150 (45)
130	21 (6)	34 (10)	55 (16)	139 (42)
140	20 (6)	32 (9)	51 (15)	129 (39)
150	18 (5)	30 (9)	47 (14)	120 (36)
160	17 (5)	28 (8)	44 (13)	113 (34)
170	16 (4)	26 (7)	42 (12)	106 (32)
180	15 (4)	25 (7)	39 (11)	100 (30)
190	14 (4)	23 (7)	37 (11)	95 (28)
200	14 (4)	22 (6)	35 (10)	90 (27)

Lightning & Surge Protection

The product adopts multi-level anti-lightning and anti-surge technology integrated with gas discharge tube, power resistor and TVS tube. The powerful lightning and surge protection barrier effectively avoids product damage caused by various pulse signals with power below 4kV, including instantaneous lightning, surge and static. However, for complicated outdoor environment, refer to instruction below for lightning and surge protection:

- The product features with dedicated earth wire, which must be firmly grounded. As for surveillance sites beyond the effective protection scope, it's necessary to erect independent lightening rods to protect the security devices. It's recommended to separate the lightning rod from the mounting pole, placing the rod on an independent pole, as shown in the figure below. If the product has to be installed on the same pole or pedestal for lightning rod, there should be strict insulation between the video cable BNC terminal, power cable, control cable and the standing pole of the lightning rod.
- For suburb and rural areas, it's recommended to adopt direct burial for the transmission cables. Overhead wiring is prohibited, because it's more likely to encounter lightning strike. Use shielded cables or thread the cables through metal tubes for burial, thus to ensure the electric connection to the metal tube. In case it's difficult to thread the cable through the tube all the way, it's acceptable to use tube-threaded cables only at both ends of the transmission line, yet the length in burial should be no less than 15 meters. The cable sheath and the tube should be connected to the lightning -proof grounding device.
- Additional high-power lightning-proof equipment and lightning rods should be installed for strong thunderstorm or high induced voltage areas (such as high-voltage substation).
- The lightning protection and grounding for outdoor devices and wires should be designed in line with the actual protection requirement, national standards and industrial standards.
- The system should perform equipotential grounding by streaming, shielding, clamping and earthing. The grounding device must meet anti-interference and electric safety requirements. There should be no short-circuiting or hybrid junction between the device and the strong grid. Make sure there's a reliable grounding system, with grounding resistance below 4Ω (below 10Ω for high soil resistivity regions). The cross-sectional area of the earthing conductor should be no less than 25mm².



Separated layout for the lightning rod and the standing pole

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